



**Passivhaus retrofit of Victorian terraced housing**

UK Passivhaus Conference  
October 2010

## greentomatoenergy – the company

The green tomato brand is applied to a growing number of environmentally friendly goods and services.



- Primary focus is on solar PV and thermal:
  - Design and installation of domestic systems
  - Financing of large scale PV installations
- Design and specify other microgeneration and ventilation systems
- Act as whole-house low energy build consultants

## The importance of retrofit

Three facts:

1. The UK is committed to 80% reductions in GHG emissions by 2050
2. 45% of current carbon emissions from buildings; 27% from homes
3. 87% of the current building stock will still be here in 2050\*

\* Figures taken from a presentation by M. Kelly (ex-DCLG) in November 2009

## Passivhaus vs EnerPHit

EnerPHit is a new standard issued by the Passivhaus institute that focuses on retrofit projects.

EnerPHit certification:

*“Only such buildings will be certified... for which the continued use of existing building elements would pose such substantial problems... that modernising to Passive House level would not be practicable or cost effective.”*



## 150 year service of a building

**A building that has  
been in operation for  
150 years may still  
have a good external  
fabric but be ready  
for full internal  
renovation**



## Project 1: Lena Gardens

Complex geometry and a rear kitchen extension make this the more challenging project.

The client is building his own dream home of the future



## Project 2: Princedale Road

Part of the £17m TSB  
Retrofit for the Future  
programme.

Project led by  
Octavia Housing.

A whole new set of  
challenges, designing  
for social housing  
and tenants who may  
not be energy  
conscious.



## The teams

Contractor



Architects

paul davis + partners  
architects urban designers

Energy consultants



Project managers  
and low energy  
design



## Challenges of retrofit



- Working in conservation areas
- No opportunity change glazing openings/orientation
- Loss of space
- London heat island effect
- Low maintenance houses suitable for social housing
- Nasty surprises...

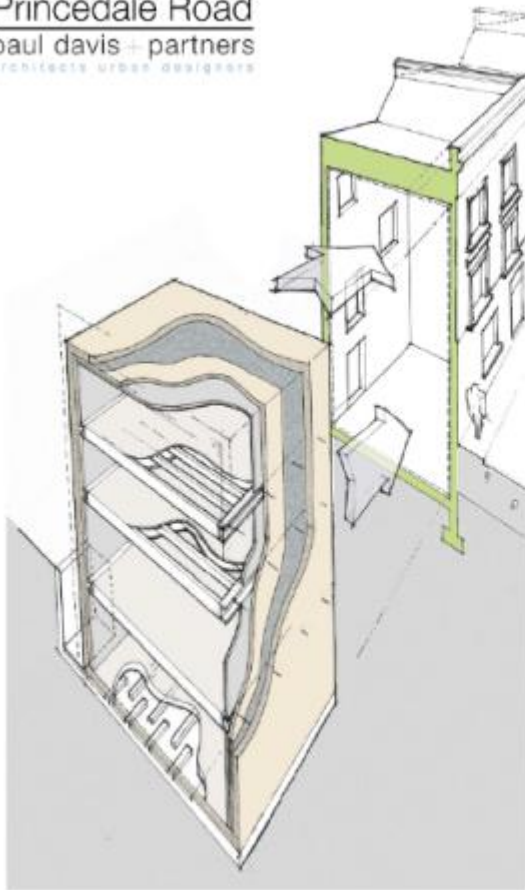




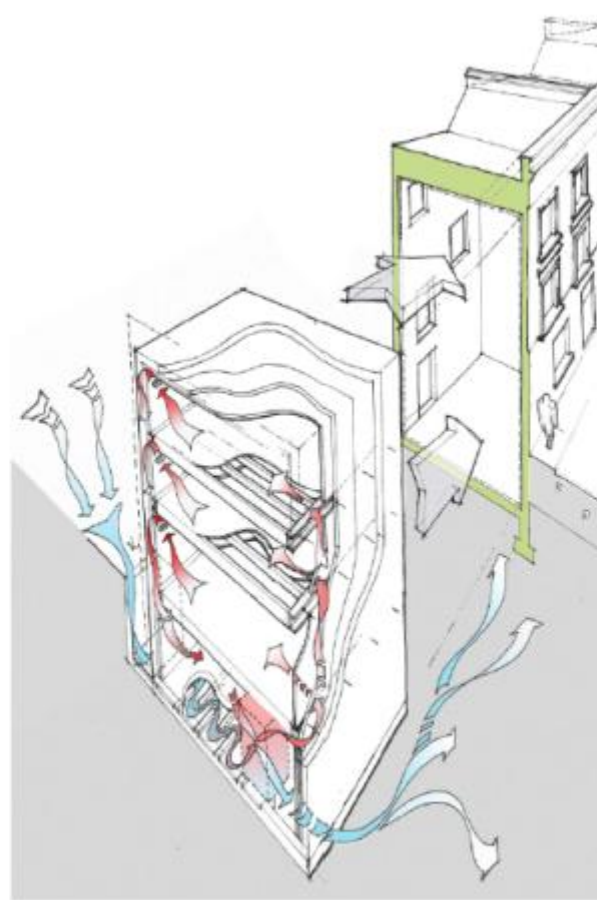


# Design overview

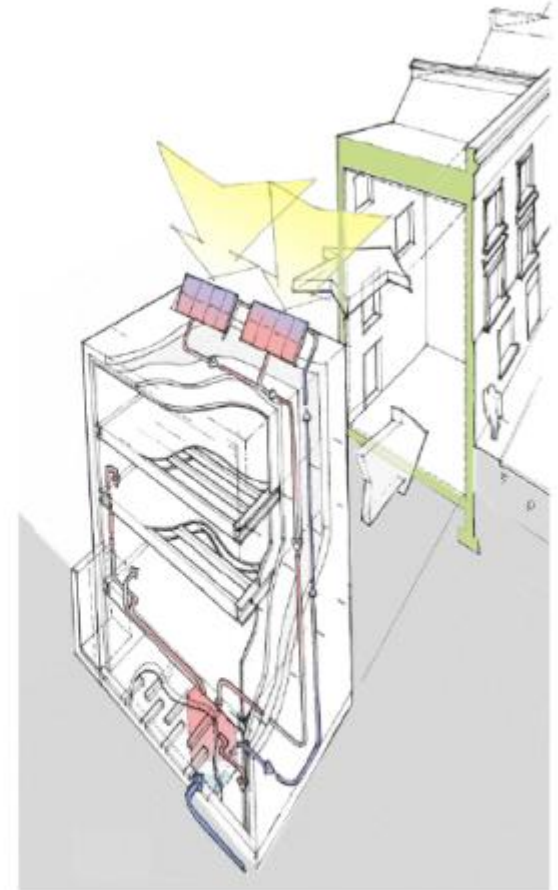
Princedale Road  
paul davis + partners  
architects urban designers



Measures on the Fabric



Ventilation with heat recovery



Energy efficient services

## Design features



- **Double-layer insulation system**
  - **Allows airtight layer to be outside services**
  - **Cut off the thermal bridges**
  - **Space loss reduced through chimney removal etc**
- **Airtightness**
  - Highly visible, continuous airtight layer
  - Ryder's system of contractor work matrix, multi-skilled workforce
- **Window and door development**
- **ESE drainback solar thermal system**
- **Genvex MVHR with extract-air source heat pump**
- **Underground heat exchanger**
- **Simple control system**





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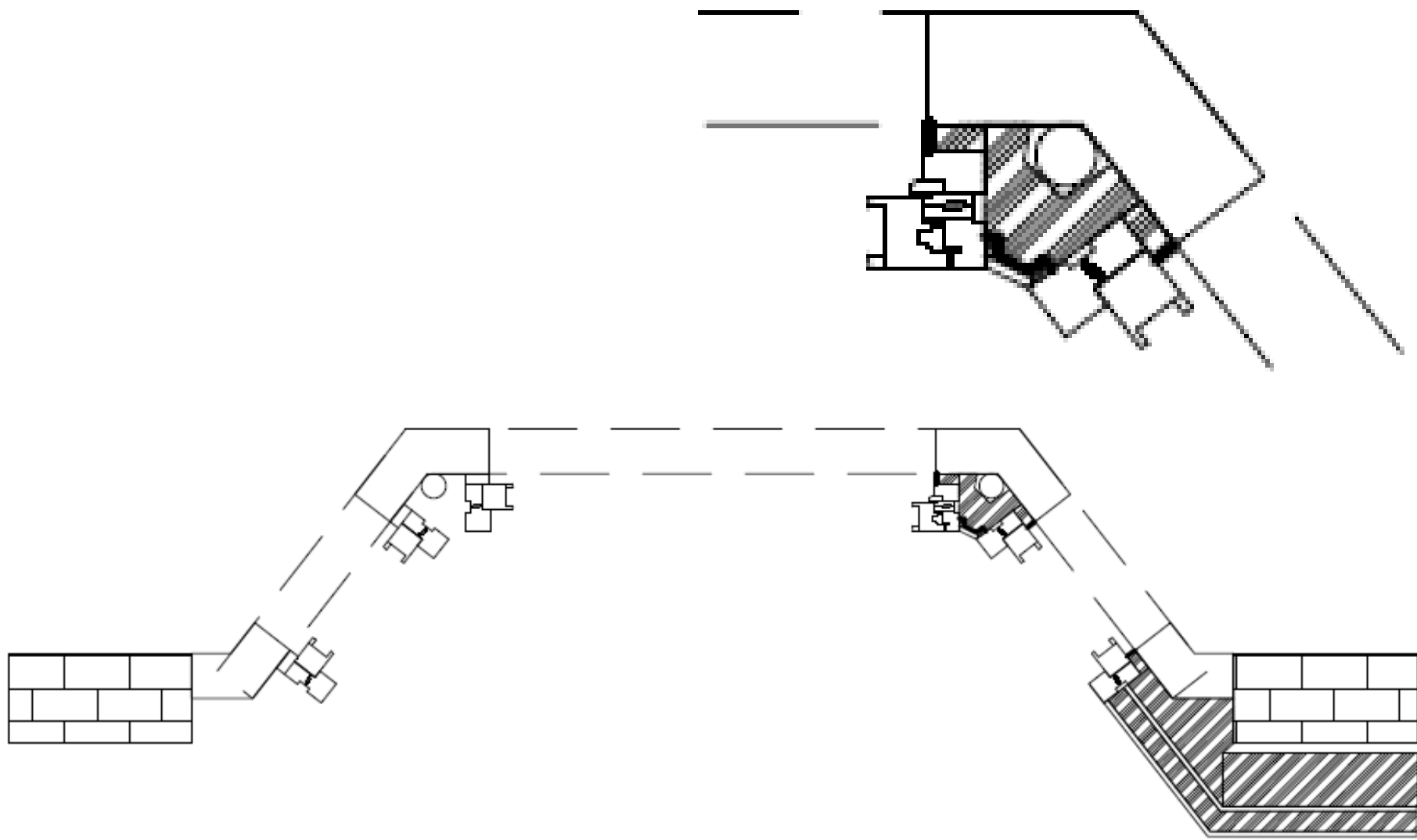


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A few other issues:

- Safety: window opening mechanism for natural ventilation.
- Future-proofing: rainwater harvesting.
- Accessibility and transparency of all systems.
- Preparation of handover booklets.
- Monitoring: through Retrofit for the Future project.

## Low-energy retrofit going forward

Full-on Passivhaus retrofit can not be rolled out on a large-scale in the same way that new-build can

What does very low energy renovation need?

1. Design.
2. Product innovation.
3. Skilled contractors.

Only master-builders taking pride in their work can really deliver the quality of building work that is necessary.

## Low-energy retrofit going forward

We will be taking tours around 100 Princedale Road this afternoon. Come along to see it in the flesh.

### Next steps:

- Make this type of building acceptable to the UK public. Show people the comfort benefits.
- Reflect energy efficient design in property prices.
- Make every renovation a retrofit.
- Other drivers will be legislation and energy prices.
- Build up the tool-kit and train the contractors.
  
- Watch the market grow...